

## A FAUNISTIC STUDY ON THE SPIDERS OF SEVERAL METROPOLIS PARKS IN TEHRAN, IRAN

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### ABSTRACT

The order Araneae (spiders) consists of 114 families and 45045 known species worldwide. It is found on all continents except for Antarctica. Spiders mainly live on insects, thus playing a major part as biological pest-control agents. In this study, field work was carried out on six localities in Tehran, and a total number of 11 species and 18 genera from 11 families were identified using a variation of identification keys. Among the species, *Filistata insidiatrix*, *Pholcus phalangioides*, *Plexippus paykulli*, *Pseudicius cinctus*, *Hyllus insularis*, *Steatoda paykulliana*, and *Linyphia triangularis* were reported from Tehran for the first time and *Xysticus striatipes* was a new record for the spider fauna of Iran.

**Key words:** Araneae, spider, Tehran, fauna

### INTRODUCTION

To date, 45045 valid spider species have been identified (<http://wsc.nmbe.ch>). This figure is assumed to be approximately one quarter of the total number of extant species on a global scale (Preston, 2004). Spiders are found on all continents except for Antarctica (Maimusa, 2012). They mainly live on insects, thus playing a major part as biological pest-control agents (Maloney, Drummond, & Alford, 2003).

Based on the latest checklist published on Iranian spiders, the number of species identified in Iran barely reaches 250 from 33 families (Ghavami, 2006), which is quite miniscule compared to the overall number of species identified worldwide. The ratio of the total land surface area of the world (148,940,000 km<sup>2</sup>) to the total number of valid spider species identified worldwide (45045) equals 3306.5 km<sup>2</sup> per species, whereas for Iran (1,531,595 km<sup>2</sup>), it is 6126.38 km<sup>2</sup> per species; an area approximately 1.85 times the size of the global estimate revealing the fact that much more work is required in order to meet this average global figure, let alone reaching the total count of species in countries with a more impressive background in Araneology. For instance, at least 53 families and 979 species have so far been identified in Turkey (Bayram, Kunt, & Danybman, 2013), a country which is only one-half the size of Iran ([en.wikipedia.org](http://en.wikipedia.org), 2014).

As mentioned, the extent of research carried out on Iranian spiders is relatively limited. Some of the work done during the past 15 years include Mozaffarian (1998), on the spiders of rice farms in Mazandaran and Guilan; Mirshamsi (1998), on the spiders of the south of Khurasan Province; and Kashefi *et al* (2012), on the fauna of Golestan Province.

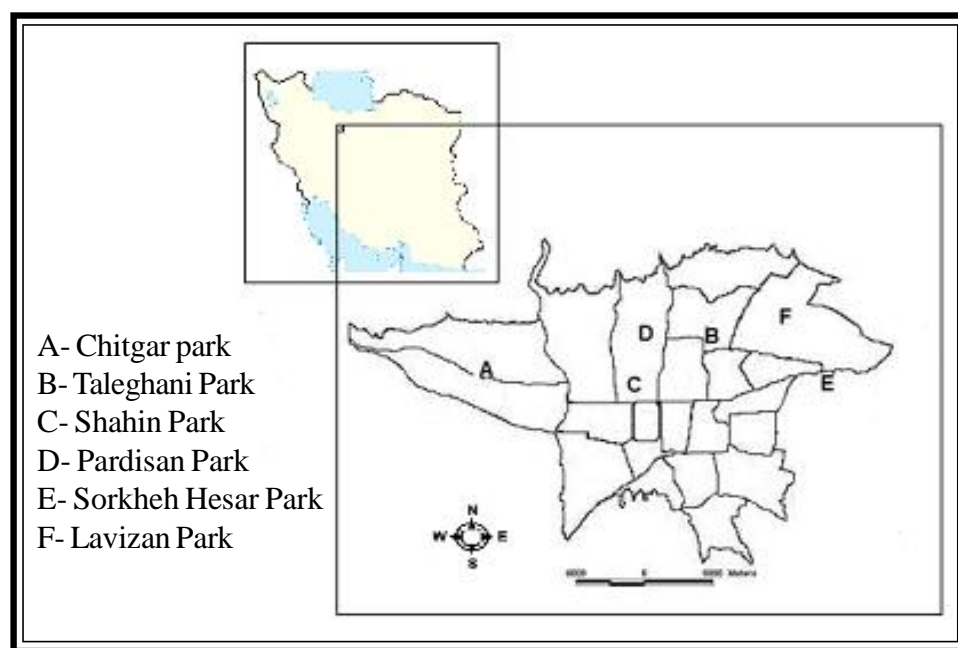
With reference to Ghavami's (2006) checklist, only 49 species out of 16 families have been reported from Tehran. In this survey, we intend to improve this number, thereby raising our current knowledge of the Iranian spider fauna.

## MATERIALS AND METHODS

In this study, fieldwork was carried out on six localities in Tehran during different seasons of the years 2006 and 2007. The collected specimens were transferred to the biosystematics laboratory of Shahid Beheshti University and preserved in alcohol (75%). The species were identified using a ZSM-1001-3E SAIran® stereo microscope and a variation of identification keys such as Kaston (1976), G. Levy (1985), and Proszynski (2013). Photos were taken by means of a DMC-FX100 Lumix® digital camera and scaling was implemented via Dino Capture 2.0.

### Localities

The sampling localities included the following parks: 1- Chitgar Park (35°43'47N 51°12'29E) 2- Taleghani Park (35°45'13N 51°25'20E) 3- Shahin Park (35°43'30N 51°21'32E) 4- Pardisan Park (35°45'01N 51°20'37E) 5- Sorkheh Hesar Park (35°41'28N 51°34'04E) 6-Lavizan Park (35°46'06N 51°30'00E).



Map no.1- Tehran

The list of abbreviations applied in this paper are as follows: Abd.= Abdomen, AER= Anterior eye row ALE= Anterior lateral eyes, AME=Anterior median eyes, Apo.= Apophysis, AT=Anal tubercle, B=Bulbus, Cal.=Calamistrum, Car.=Carapace, Che.=Chelicerae, Cly.=Clypeus, Co.=Coxa, COP= Copulatory opening, CR=Cephalic region, Cy.=Cymbium, E=Embolus, EA=Eye arrangement, ECM= External cheliceral margin, En.=Endite, Epi.=Epigyne, F=Fang, Fe.=Femur, Fo.=Fovea, FR=Foveal region, GB= Genital bulb, GP= Genital plate, ICM= Internal cheliceral margin, L=Labium, Max.= Maxillae, Met.=Metatarsus, MOQ= Median ocular quadrangle, MP= Male palp, N=Notch, OA=Ocular area, Pa.=Patella, Pa.cy.= Paracymbium, PER=Posterior eye row, PLE=Posterior lateral eyes, PME=Posterior median eyes, Pro.=Protuberance, Prc.= Procursus, Re.Apo.=Retrolateral apophysis, Re.Pr.=Retrolateral protuberance, S.Sr.=Sclerotized serrated ridge, St.=Sternum, Ta.=Tarsus, Teg.=Tegulum, Ta.=Tegular apophysis, Ti.=Tibia, Ti.Apo.=Tibial apophysis, Tro.=Trochanter, V.Apo=Ventral apophysis, W=window.

## RESULTS AND DISCUSSION

In this study, 77 specimens were collected out of which a total number of 11 species and 18 genera from 11 families were identified.

### **Uloboridae Thorell, 1869**

#### ***Uloborus walckenaerius* Latreille, 1806**

**Material examined:** 6 females (All localities, Oct-Mar. 2006-2007). **Diagnosis:** Epi. bearing two finger-like processes as in Figure 1A. **Color:** dark brown longitudinal bands on brown Car.; Abd. light brown.

### **Oecobiidae Blackwall, 1862**

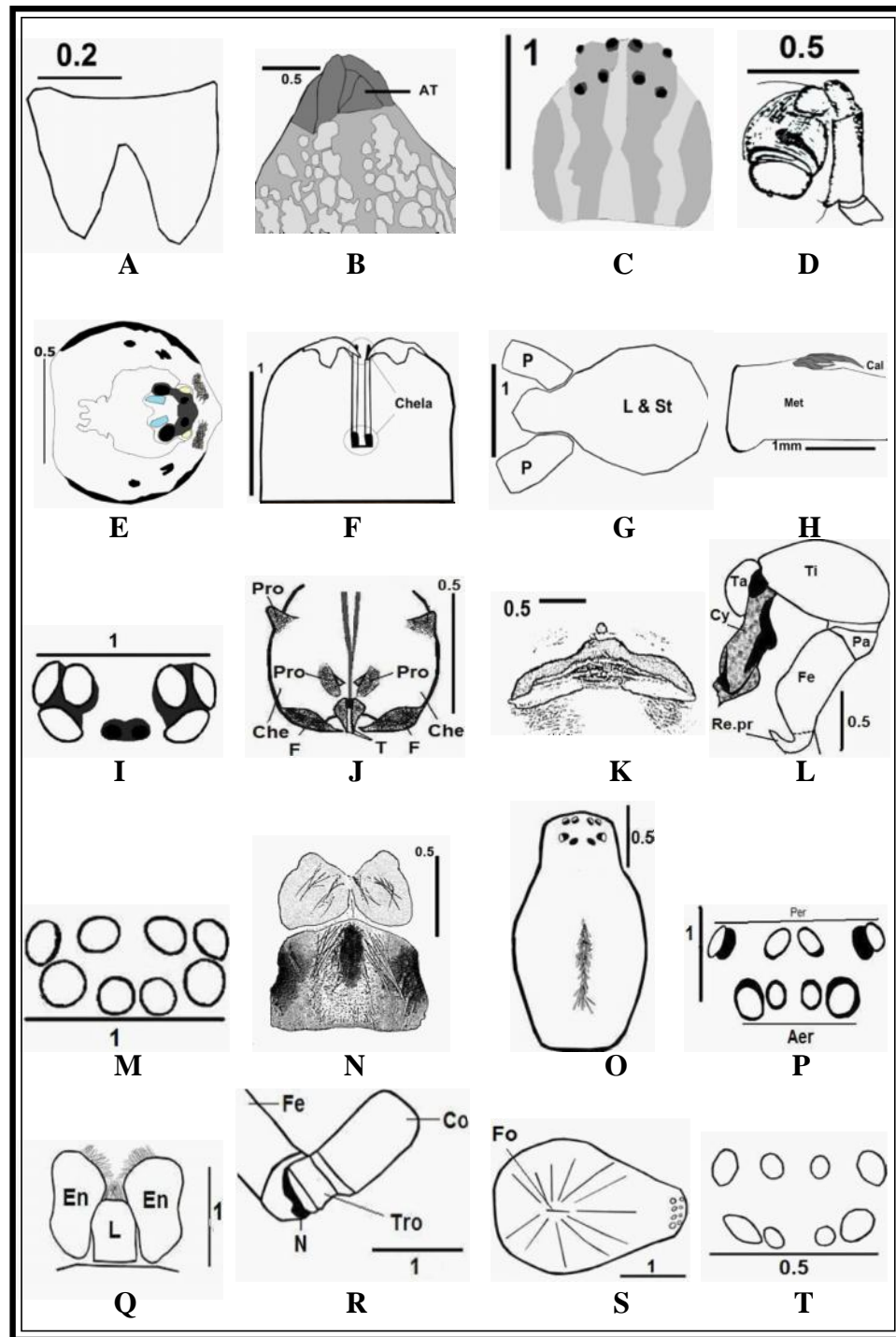
#### ***Oecobius* sp. Lucas, 1848**

**Material examined:** 2 females (Pardisan P., Nov. 2006). **Description:** 2 mm, Car. round, wider than long; AME largest. **Color:** marginal spots on pale Car. (fig.3D), OA dark; median longitudinal band on Abd.

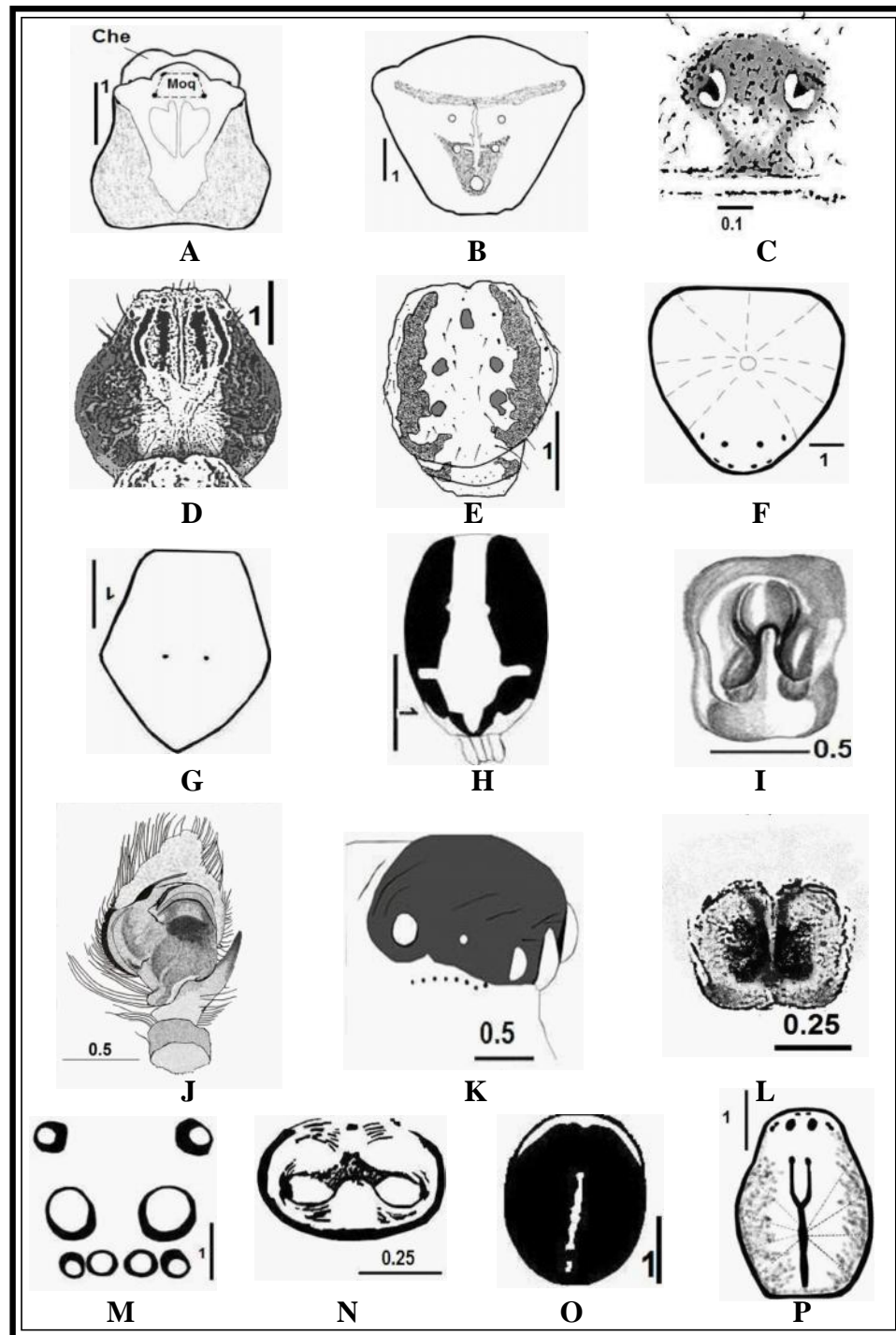
### **Filistatidae Sundevall, 1833**

#### ***Filistata insidiatrix* (Forsk., 1775)**

**Material examined:** 1 female (Lavizan P., Nov. 2006). **Description:** 9 mm, PME circular (Fig. 3G), Che. proximally fused to lamella at distal end (Fig. 1F); L. and St. fused, no borders detected (Fig. 1G); short Cal. with very few bristles (Fig. 1H). **Color:** dark median band reaching FR on Car.; Abd. dark tan.

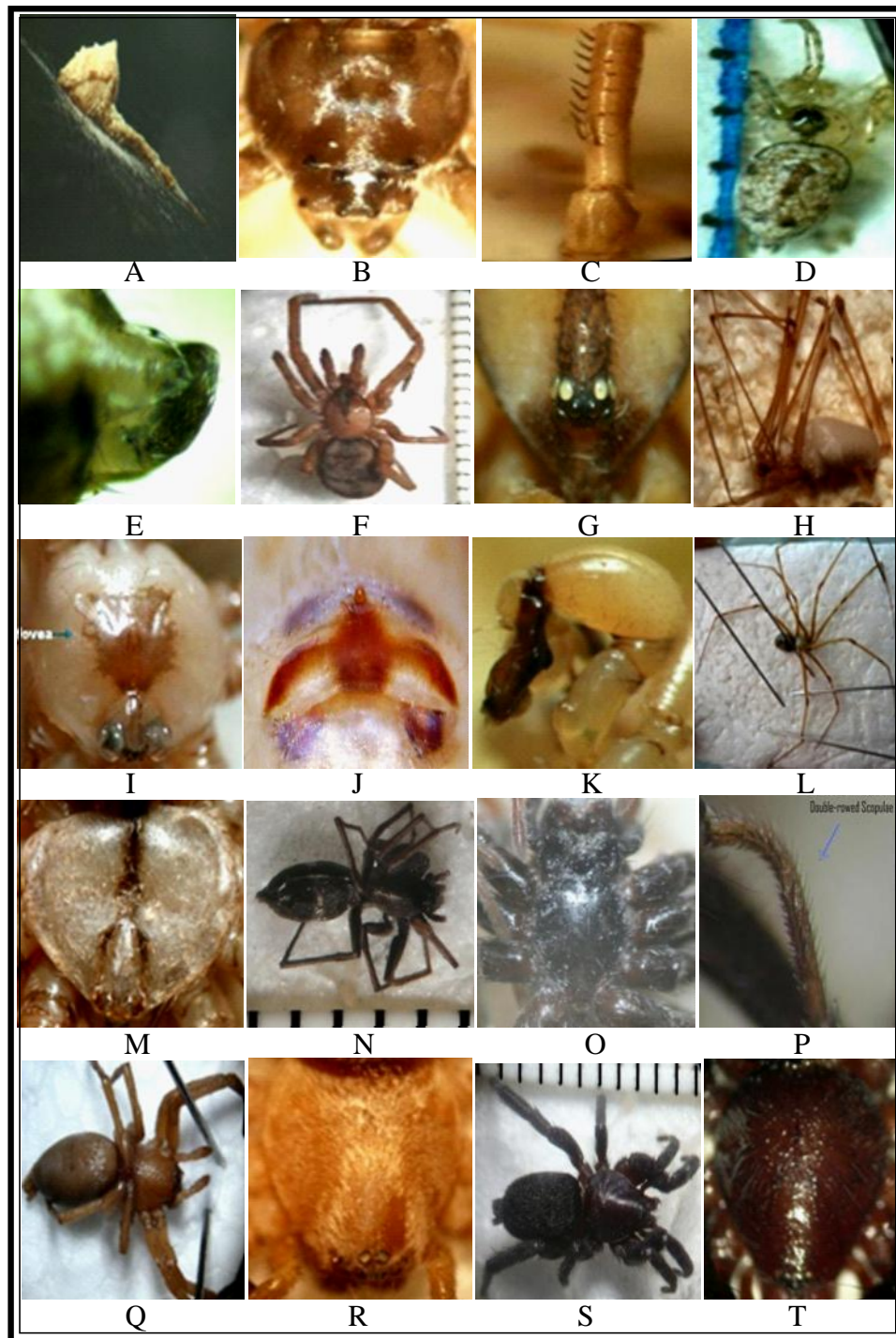


**Figure 1.** *U. walckenaerius*: A- Finger-like processes, B- AT., C- Car., D- MP. *Oecobius* sp.: E- Car. and EA. *F. insidiatrix*: F- Lamella, G- Fused L and St., H- Cal. *P. phalangioides*: I- EA, J- Che., K- Epi., L- MP. *A. doriai*: M-EA, N-Epi. *Micaria* sp.: O- Car. and EA. *Drassodes* sp.: P- EA, Q- L and Max., R- N on Tro. *Zelotes* sp.: S- Car., T- EA.

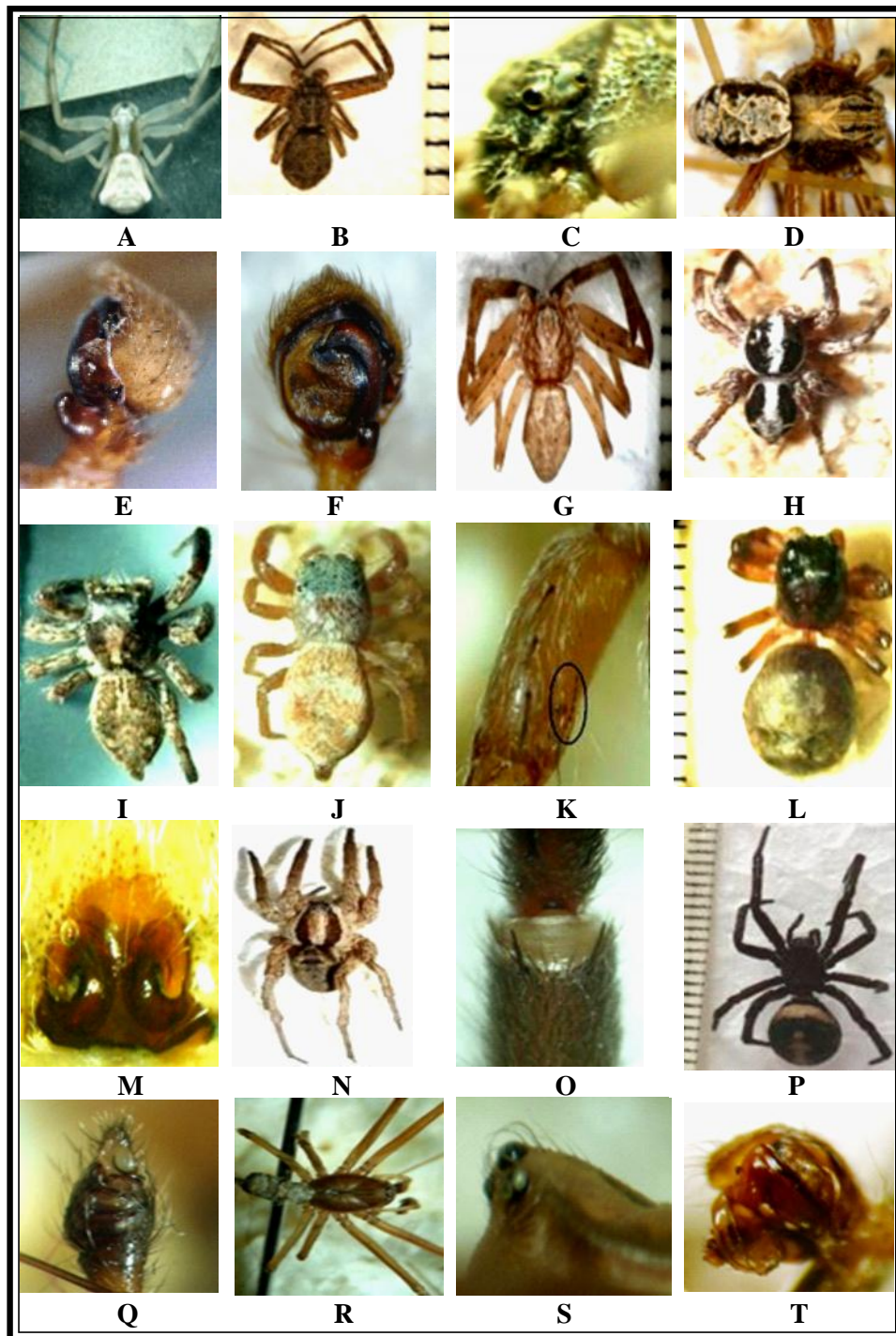


**Figure 2.** *T. onustus*: **A**- Car. and EA, **B**- Abd., **C**- Epi., *X. striatipes*: **D**- straight lines and concave stripes **E**- Abd. *Philodromus* sp.: **F**- Car. and EA, **G**- Abd. (dorsal view). *P. paykulli*: **H**- Male Abd., **I**- Epi., **J**- MP. *P. cinctus*: **K**- Black dots below lateral eyes, **L**- Epi., *Trochosa* sp.: **M**- EA., *S. paykulliana*: **N**- Epi., **O**-crescent-shaped marking on Abd., *L. triangularis*: **P**- Car.





**Figure 3.** *U. walckenaerius*: **A-** Lateral view, **B-** Car. and EA, **C-** Male Tib I. *Oecobius* sp.: **D-** Dorsal view, **E-** AT. *F. insidiatrix*: **F-** Dorsal view, **G-** Cly. and EA. *P. phalangioides*: **H-** Lateral view, **I-** Car., **J-** Epi., **K-** MP. *A. doriai*: **L-** Dorsal view, **M-** Car. *Micaria* sp.: **N-** Dorsal view, **O-** St., **P-** Tarsal Scopulae. *Drassodes* sp.: **Q-** Dorsal view, **R-** Car. *Zelotes* sp.: **S-** Dorsal view, **T-** Car.



**Figure 4.** *T. onustus*: **A**- Dorsal view. *Tmarus* sp.: **B**- Dorsal view, **C**- Lateral eyes. *X. striatipes*: **D**- Dorsal view, **E**-MP (retrolateral), **F**- MP (ventral). *Philodromus* sp.: **G**- Dorsal view. *P. paykulli*: **H**- Male (dorsal view), **I**- Female (dorsal view). *P. cinctus*: **J**- Dorsal view, **K**- Fe I (lateral). *H. insularis*: **L**- Dorsal view, **M**- Epi. *Trochosa* sp.: **N**- Dorsal view, **O**- Tib I. *S. paykulliana*: **P**- Dorsal view, **Q**- MP. *L. triangularis*: **R**- Dorsal view, **S**- CR (lateral), **T**- MP.

**Pholcidae C.L. Koch, 1851**

***Pholcus phalangioides* (J.C. Fuesslin, 1775)**

**Material examined:** 7 Females 3 Males, (All localities, Oct-Mar. 2006-2007). **Diagnosis:** Epi. broader than long with a sclerotized hook (Fig. 1K, 3J); MP. U-shaped in resting posture with Tro., Fe. and Pa. forming one axis, Ta., Prc. and GB forming the other axis, and Ti. intermediate between the two as in Figures 1L and 3K (Uhl et al, 1995). **Description:** Approx. 10 mm, round prominent Car., FR brown (Fig. 3I); Che. proximally fused, bearing one sizeable marginal tooth.

***Artema doriai* (Thorell, 1881)**

**Material examined:** 2 Females, (Chitgar P., Oct. 2006). **Diagnosis:** female GP flat with a pair of dark areas as in Figure 1N (Huber, 2005). **Description:** 8 mm, bulky in appearance, Car. with a pit in the FR; Abd. globular. **Color:** Car. somewhat dim gray, dark median band and spots on Abd., legs light brown.

**Gnaphosidae Pocock, 1898**

***Micaria* sp. N. Westring, 1851**

**Material examined:** 1 female (Pardisan P., Nov. 2006). **Description:** 4 mm (Fig. 3N), CR slender, FR bearing white scale-like hairs (Fig. 1o), ovoid St. tapering at posterior extreme; legs I and II with stout Fe., often darker than other segments. **Color:** general habitus dark brown to black (iridescent hairs) with white transverse spots on Abd.

***Drassodes* sp. N. Westring, 1851**

**Material examined:** 14 immatures (Taleghani P., Jan. 2007). **Description:** average size 10 mm, PME much closer to one another than to PLE (Fig. 1P); FR covered with short hairs (Fig. 3R); ICM and ECM with 2 and 3 teeth, respectively; Tro. each with one N (Fig. 1R); 3 pairs of slits on the dorsal surface of Abd. **Color:** Car. light brown with golden-colored hairs; Abd. dark tan.

***Zelotes* sp. Gistel, 1848**

**Material examined:** 1 Female (Chitgar p., Oct. 2006). **Description:** 7 mm, Car. oval (Fig. 3T) with dark lines radiating from the FR (Fig. 1S); ALE larger than AME, PER straight and roughly longer than AER (Fig. 1T); dorsal surface of Abd. with 3 pairs of transverse slits. **Color:** general habitus dark; dark brown Car. and legs, Abd. black (Fig. 3S); branchial operculae yellow.



**Thomisidae Sundevall, 1833**

***Thomisus onustus* Walckenaer, 1805**

**Material examined:** 1 Female (Taleghani p., Oct. 2007). **Diagnosis:** sclerotized Epi. curved outward with the spermathecal openings on a slanted surface (Fig. 2C) **Description:** 8mm (Fig. 4A), MOQ wider posteriorly (Fig. 2A); triangular Abd. broader posteriorly (Fig. 2B). **Color:** legs and Car. both pale gray; Car. with two dark longitudinal bonds; Abd. displaying a whitish color (Fig. 4A). **Note:** the color pattern of *T. onustus* may differ based on the surface on which it positions itself to hunt (Thery et al, 2005).

***Xysticus striatipes* L. Koch, 1870**

**Material examined:** 1 Male (Shahin p., Sep. 2007) **Diagnosis:** Ventral tibial apophysis widened on the tip and darker on distal margins; retrolateral tibial apophysis smaller and lighter in color along with a slick black hook on the distal extreme ; Dentate embolus resembling a bent and pointy screw. **Description:** 5 mm, two straight dark brown lines immediately behind PME encompassed by two concave stripes bent like parentheses (Fig. 2D); sternum darker in the middle and lighter on the margins; five oval markings on Abd., four being in pairs and one at the anterior extreme of Abd. (Fig. 2E).

***Tmarus* sp. Simon, 1875**

**Material examined:** 1 immature (Pardisan p., Nov. 2006). **Description:** 5 mm, Car. as wide as long, OA elevated; Cly. sloped; ALE and PLE on large tubercles (Fig. 4C); claws with denticles (Levy, 1985). **Color:** grayish brown with dark wart-like spots all over the Car., legs, and Abd. (Fig. 4B, 4C).

**Philodromidae Thorell, 1870**

***Philodromus* sp. C.A. Walckenaer, 1825**

**Material examined:** 2 immatures (Taleghani p., Oct. 2006). **Description:** 5 mm, Car. broader than long (Fig. 4G); eyes small and almost equal, AER clearly shorter than PER; legs long and equal. **Color:** general habitus sandy, legs speckled with brown.

**Salticidae Blackwall, 1841**

***Plexippus paykulli* (Savigny et Audouin, 1827)**

**Material examined:** 5 males & 3 Females (All localities, Oct-Mar. 2006-2007). **Diagnosis:** Epi. sclerotized bearing a prominent anterior lobe surrounded by two crescent-shaped grooves and a distinct posterior median groove with a COP on either side (Fig. 2I); spermathecae partially visible; MP with a broad B sclerotized

on the margin, short E situated on the anterior side of B (Fig. 2J). **Color:** Male black with a white dorsal longitudinal band widening at the posterior extreme of the Abd. (Fig. 4H); female resembling a similar dorsal pattern to the male but with a dun general habitus and a tan-colored band instead of white (Fig. 4I).

***Pseudicius cinctus* (O.P.-Cambridge, 1885)**

**Material examined:** 4 Females (Lavizan and Shahin P., Nov. 2006 and Mar. 2007).

**Diagnosis:** Epi. resembling the internal surface of an apple cut in half, with two large W and sclerotized COP (Fig. 2L). **Description:** 7 mm, prosoma and opisthosoma both flattened when viewed from the side; a row of black dots below the lateral eyes (Fig. 2K) with corresponding dots and hairs on the Fe of leg I (Fig. 4K). **Color:** CR dark, thoracic region and legs brown, Cephalothorax with white hairs, stripes of the Abd. yellow and orange.

***Hyllus insularis* Metzner, 1999**

**Material examined:** 1 Female (SorkhehHesar P., May 2007). **Diagnosis:** a narrow septum between the windows on the Epi.; windows coiled and sclerotized posteriorly (Fig. 4M). **Description:** 11 mm, OA dark, pedicel visible from dorsal view. **Color:** CR dark, thoracic region dark brown, legs light brown except for the distal extreme of all Fe. as well as the Pa. and Ti. which are dark brown; Abd. somewhat round in shape and grayish brown in color (Fig. 4L).

**Lycosidae Sundevall, 1833**

***Trochosa* sp. Koch, 1846**

**Material examined:** 1 Female (Taleghani P., Nov. 2006). **Description:** 12 mm, two dark brown longitudinal stripes extending from the OA (Fig. 4N); AER visible from dorsal view, PLE's larger than AER's (Fig. 2M). First female Ti. with 2 ventral spines (Fig. 4o). **Color:** first two pairs of legs gradually darkening to the tip, Car. light brown with two dark brown longitudinal stripes, Abd. grayish brown.

**Theridiidae Sundevall, 1841**

***Steatoda paykulliana* (Walckenaer, 1806)**

**Material examined:** 1 Male & 19 Females (All localities, Oct-Mar. 2006-2007).

**Description:** average size 9 mm, lateral eyes on common tubercles; male ECM with a large tooth; bright anterior crescent-shaped marking on Abd. (Fig. 2o); Epi. as in Figure 2n, and MP as in Figure 4Q. **Color:** prosoma and legs dark brown, a white or orange median stripe on black Abd.

### **Linyphiidae Blackwall, 1859**

#### ***Linyphia triangularis* (C. Clerck, 1757)**

**Material examined.** 1 Male (Shahin P., Mar. 2007). **Diagnosis:** MP with a long, slender, and bent Pa.cy (Fig. 4T). **Description:** 6 mm, Che. large, Car. with a dark median longitudinal band bifurcated anteriorly, half-way up the CR (Fig. 2P); several bristles projecting forward on the male CR just behind the PME (Fig. 4S). **Color:** Car. and legs light brown, St. black, ventral and dorsal surfaces of the Abd. dark and tan, respectively (Fig. 4R).

Among the specimens, the only species with a wheel-shaped web was *U. walckenaerius*. This matter may be indicative of a lack of dense vegetation indispensable for most orb-weaving spiders to thrive. Secondly, only three species, namely *U. walckenaerius*, *P. phalangioides*, and *A. doriai* were stationary predators using their webs to hunt, whereas the rest were dependent upon mobility. This matter possibly reveals the scarcity of airborne food resources in the localities. Among the species, *F. insidiatrix*, *P. phalangioides*, *P. paykulli*, *P. cinctus*, *H. insularis*, *S. paykulliana*, and *L. triangularis* were reported from Tehran for the first time, and *Xysticus striatipes* was a new record for the spider fauna of Iran.

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